REMARKS

In response to the Examiners 35 US.C. §103 rejections against the claims, we enclose an amended Independent claim 51 which includes the further limitation that the metal areas are at a distance of 0.05 – 1.5 mm from the respective break line in between said metal areas. This limitation is mentioned in section [0031] of the description of the figures. Furthermore the limitations of prior claim 22 has also been included in the amended claim 51.

The following amendments are made to the claims:

Claims 28, 29, 30, 33, 35, 40, 46, 47, 48, 49 and 50 are cancelled. All remaining claims originally depending on claim 50 are amended, such that they now depend on claim 51.

As far as claim 51 is concerned, the Examiner had referred to Schulz-Harder (US 6,027,221) and Kondratenko (US 5,609,284). Although Schulz-Harder discloses a ceramic layer with a thickness of 0.2 to 2mm and metal areas with a thickness of 0.1 to 6mm, Schulz-Harder does not disclose metal areas that are at a distance of 0.1 – 3mm from another and at a distance of 0.05 – 1.5mm from the respective break line in between the metal areas.

Kondratenko (US 5,609,284) does not disclose either a ceramic layer having a thickness between 0.1 and 3mm or metal areas with a thickness between 0.02 and 0.6mm or between 0.1 and 0.6mm, nor metal areas being at a distance between 0.1 – 3mm from another nor metal areas being at a distance of 0.05 – 1.5mm from the respective break line in between said metal areas.

The method of amended claim 51 is new over the cited art (Schulz-Harder and Kondratenko) and is not disclosed or suggested by combining the teachings of Schulz-Harder and Kondratenko.

The Examiner had argued in section 13 of the Office Action, that one of ordinary skill in the art would have found it obvious to separate the metal areas with a distance claimed in claim 51 in view of Kondratenko's formula (column 7, lines 20 – 23 of Kondratenko) and in view of the fact, that the laser spot must be applied to an area not covers by metal.

This is actually not correct, as it is completely irrelevant for the heating process itself, whether the laser spot is applied only to the area not covered by the metal or to an area including also the edge portions of the metal areas. The problem when making the separating or break lines by heating and shock cooling is completely different. The metallizations are applied to the ceramic layers preferably by DCB-bonding or by active soldering. This means high process temperatures of 1025°C to 1083°C (DCB-bonding) or of 800°C to 1000°C (active soldering) and after that cooling to room temperature. Because of the completely different thermal expansion co-efficient of ceramic and copper this also means thermal based mechanical stresses inside the ceramic material and weakening of the ceramic material near the transition between ceramic and copper and especially also near the edges of the metal areas.

When the separating or break lines are produced in the ceramic layer in between the metal areas by heating and shock cooling, these separating or break lines are formed by additional areas of thermal based mechanical stresses inside the ceramic material and by additional weakening the ceramic material. This also means, that care must be taken, that there is no overlapping of the weakening of the ceramic layer resulting from applying the metallization to the ceramic layer and of the weakening of the ceramic layer by producing the separating or break lines.

Therefore it is very essential that the meal areas have a distance also from the respective breaking or separate line, otherwise the ceramic layer would break in a totally uncontrolled manner and not along the separating or break lines when the substrate is separated into multiple substrates by breaking.

Reconsideration of the Refusal to approve the applications as claimed is requested. If any questions remain, please do not hesitate to call the undersigned.

Respectfully submitted,

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